<u>IN THE CLAIMS</u>:

Please **AMEND** claims 13 and 25-26 as follows.

Please **ADD** claims 27-36 as follows.

1-12. (Cancelled)

13. (Currently Amended) A ~~computer-implemented~~ method, ~~the method~~ comprising:

determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points; and wherein a plurality of the weight vectors represents a single non-linear cluster;

performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers;

performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure; and

determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points,

wherein the method is an unsupervised method that is configured to be suitable for an on-line system.

14. (Previously Presented) The method according to claim 13, wherein each iteration in the first iterative process comprises

selecting a winner weight vector for each data point on the basis of the distance between the data point and the weight vectors, and

calculating a next value for each weight vector on the basis of the current value of the weight vector and a first neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector, and

wherein the second data structure comprises a first coefficient for each of the weight vectors in the lattice structure and each iteration in the second iterative process comprises calculating a next value of each first coefficient based on:

the current value of the first coefficient, and

a combination of

a first coefficient of the winner weight vector,

a second neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector, and

an adjustment factor for adjusting convergence speed between iterations.

15. (Previously Presented) The method according to claim 13, wherein the determining the weight vectors that correspond to cluster centers comprises selecting local maxima in the second data structure.

16. (Previously Presented) The method according to claim 14, wherein the combination is or comprises multiplication.

17. (Previously Presented) The method according claim 14, wherein the second neighborhood function is not monotonous.

18. (Previously Presented) The method according to claim 14, wherein the first coefficients are limited to a range [0,1] and the second neighborhood function gives negative or positive values, respectively, for some distances.

19. (Previously Presented) The method according to claim 14, wherein the second neighborhood function depends on a number of prior iterations.

20. (Previously Presented) The method according to claim 13, wherein the input data points represent real-world quantities.

21. (Previously Presented) The method according to claim 14, wherein the first data structure is or comprises a self-organizing map.

22. (Previously Presented) The method according to claim 21, further comprising:

estimating an upper limit K for a number of clusters in the self-organizing map;

defining a coefficient vector $\Theta i = (\theta_{i,1}, \theta_{i,2}, \ldots \theta_{i,K})$ for each weight vector i in the self-organizing map, the coefficient vector comprising K second coefficients $\theta_{i,l}$, each of which represents a weighting between the weight vector i and a label l; and

assigning cluster label l to weight vector i if:

$$l = \arg\max_{1 \leq k \leq K} \theta_{i,k} .$$

23. (Previously Presented) The method according to claim 22, wherein each iteration in the second iterative process comprises calculating a next value of each second coefficient based on the current value of the second coefficient and a combination of

a coefficient of the winner weight vector,

a third neighborhood function of distance, and

an adjustment factor for adjusting convergence speed between iterations.

24. (Previously Presented) A computer-readable program product comprising a computer program code embodied on a computer-readable medium, the computer-readable program product being configured to control a processor to perform:

determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points; and wherein a plurality of the weight vectors represents

a single non-linear cluster;

performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers;

performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure; and

determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points,

wherein the executing the computer program is configured to carry out an unsupervised method that is configured to be suitable for an on-line system.

25. (Currently Amended) An apparatus ~~computer~~, comprising:

first determination means for determining cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points; and wherein a plurality of the weight vectors represents a single non-linear cluster;

first performance means for performing a first iterative process for iteratively updating the weight vectors such that the weight vectors move toward the cluster centers;

second performance means for performing a second iterative process for iteratively updating a second data structure utilizing results of the iterative updating of the first data structure; and

second determination means for determining, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points,

wherein the ~~computer~~ apparatus is configured to operate using an unsupervised method that is configured to be suitable for an on-line system.

26. (Currently Amended) An apparatus ~~computer~~, comprising:

a processor configured to

~~a first determination unit configured to~~ determine cluster centers in a first data structure, wherein the first data structure comprises a lattice structure of weight vectors that create an approximate representation of a plurality of input data points; and wherein a plurality of the weight vectors represents a single non-linear cluster;

~~a first performance unit configured to~~ perform a first iterative process to iteratively update the weight vectors such that the weight vectors move toward the cluster centers;

~~a second performance unit configured to~~ perform a second iterative process to iteratively update a second data structure utilizing results of the iterative updating of the first data structure; and

~~a second determination unit configured to~~ determine, based on the second data structure, several sets of weight vectors in said lattice structure such that in each set, the weight vectors correspond to the same cluster centers of the input data points,

wherein the ~~computer~~ apparatus is configured to operate using an unsupervised method that is configured to be suitable for an on-line system.

27. (New) The apparatus of claim 26, wherein the processor is further configured to:

select a winner weight vector for each data point on the basis of the distance between the data point and the weight vectors; and

calculate a next value for each weight vector on the basis of the current value of the weight vector and a first neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector,

wherein the second data structure comprises a first coefficient for each of the weight vectors in the lattice structure and each iteration in the second iterative process comprises calculating a next value of each first coefficient based on:

the current value of the first coefficient, and

a combination of

a first coefficient of the winner weight vector,

a second neighborhood function of the distance on the lattice structure between the weight vector and the winner weight vector, and

an adjustment factor for adjusting convergence speed between iterations.

28. (New) The apparatus of claim 27, wherein the processor is further configured to determine the weight vectors that correspond to cluster centers by selecting local maxima in the second data structure.

29. (New) The apparatus of claim 27, wherein the combination is or comprises multiplication.

30. (New) The apparatus of claim 27, wherein the second neighborhood function is not monotonous.

31. (New) The apparatus of claim 27, wherein the first coefficients are limited to a range [0,1] and the second neighborhood function is configured to give negative or positive values, respectively, for some distances.

32. (New) The apparatus of claim 27, wherein the second neighborhood function depends on a number of prior iterations.

33. (New) The apparatus of claim 27, wherein the input data points represent real-world quantities.

34. (New) The apparatus of claim 27, wherein the first data structure is or comprises a self-organizing map.

35. (New) The apparatus of claim 27, wherein the processor is further configured to:

estimate an upper limit K for a number of clusters in the self-organizing map;

define a coefficient vector $\Theta i = (\theta_{i,1}, \theta_{i,2}, \ldots \theta_{i,K})$ for each weight vector i in the self-organizing map, the coefficient vector comprising K second coefficients $\theta_{i,l}$, each of which represents a weighting between the weight vector i and a label l; and

assign cluster label l to weight vector i if:

$$l = \underset{1 \leq k \leq K}{arg\ max}\ \theta_{i,k}.$$

36. (New) The apparatus of claim 27, wherein the processor is further configured in each iteration in the second iterative process to calculate a next value of each second coefficient based on the current value of the second coefficient and a combination of

a coefficient of the winner weight vector,

a third neighborhood function of distance, and

an adjustment factor for adjusting convergence speed between iterations.